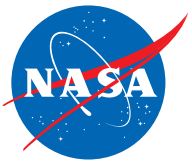


THE INNOVATION CATALYST



April 2022

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THE GODDARD PULSE: FY22



NTRs submitted: 96

TECH TRANSFER TIP

with Technology Manager
Dennis Small:

PLANNING TO DISCUSS A
POTENTIAL PARTNERSHIP?
REMEMBER: A **SPACE ACT**
AGREEMENT OR **INTERAGENCY**
AGREEMENT SHOULD BENEFIT
NASA AND THE PARTNER
ORGANIZATION.

»» UPCOMING EVENTS:



INNOVATOR HOUR:
TUESDAY, APRIL 12,
1:00–2:00 P.M.



INNOVATION

WORKING WITH SPO



From idea to infusion: how to work with SPO to push your technology forward

It all starts with a **New Technology Report (NTR)**. Ideally you submit an NTR before any public disclosure of your technology. In fact, you should submit an NTR as soon as you realize that you might have something new, even if it is just an idea or a work in progress. To learn more about when to report your NTR and why late is still better than never, click here (<https://invention.nasa.gov/when-to-submit.php>).

Once you submit your NTR, SPO, the Office of General Counsel (OGC), and agency contractors review your invention to determine its commercial viability and patentability. This is a complex process and requires your collaboration as the inventor at every step of the way.



TRIAGE



SCREEN



ASSESSMENT



PATENT

NOTE: the graphic above is **not** a comprehensive breakdown of this process. For more information, reach out to SPO at techtransfer@gsfc.nasa.gov or check out our **September issue of The Innovation Catalyst**.

SPO technology managers, OGC patent attorneys, or agency contractors may contact you at any point during the evaluation of your NTR. Your timely cooperation throughout the process is critical. Time is of the essence, especially if your idea or invention receives a favorable commercialization assessment and meets the criteria for a patent application.

Commercializing your technology is a big part of SPO's role in this process. Our technology managers conduct market research and identify companies with the expertise and resources to bring your technology to market. From there, they contact and meet with potential licensees to determine whether they are a good fit.

Your help at this stage is not only appreciated but highly encouraged. As most

Still have questions? We can help! Get in touch at: techtransfer@gsfc.nasa.gov

NASA inventions are early-stage and require substantial investment for further development, you may already have potential partners for research and development in mind. In this case, SPO can help negotiate licenses and/or partnership agreements.

Pointing SPO in the direction of potential licensees or R&D partners can go a long way in helping to market your technology successfully. Although you as the inventor cannot participate in financial negotiations for any license, you can (and in fact should) meet with potential licensees to discuss your technology and provide them with more details.

You are the expert and best source of information about your technology. Your involvement can help SPO develop effective marketing materials for your invention. The SPO marketing team develops marketing products for business professionals, and your expertise is vital for the creation of a high-level introduction to your invention that is detailed, compelling, and highly accurate.

SPO representatives also will work to attract potential collaborators and licensees by attending conferences and tradeshows, organizing webinars and presentations, and hosting outreach activities such as Commercialization Training Camps. You're encouraged to join in these activities, whether that means dropping in to give a short presentation or attending some of our events yourself.

Finally, SPO regularly prepares and publishes press releases, spinoffs, success stories, and other features to highlight your technology and attract more licensing interest. We may contact you for short interviews or request additional information pertaining to your invention. Your knowledge and expertise are essential for the accuracy and credibility of everything we do. Remember, as the inventor, you are the expert!

TECHNOLOGY MANAGERS

Questions about the NTR evaluation process?
Want to know more about how assessments are conducted? Need specific assistance? Reach out to your code-assigned TM!



Dennis Small

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Codes: 100, 200, 300,
420, 600, 603-606, 700



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660, 670



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Codes: 450, 480, 540,
550, 560, 590, 690

FEATURED SPINOFFS

3D PRINTED SUPERALLOYS, SUPER POLISHED

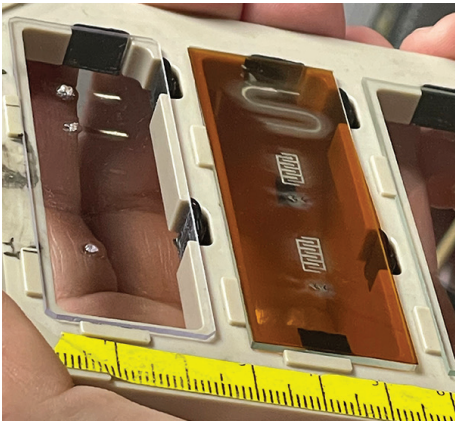
OPTIMIZING 3D PRINTED METAL COMPONENTS



3D printing can reduce the weight, number, and potential points of failure (seams) of rocket engine parts by printing metal components as single units. However, the rough surface finish of printed parts can cause other problems, such as an increased rate of corrosion. Enter REM Surface Engineering, from Southington, Connecticut. Under two SBIR contracts from NASA's Marshall Space Flight Center, REM developed a method to surface-finish nickel and iron-based superalloys, which are resistant to the high-pressure environment of hydrogen engines. REM's methods have drawn the interest of commercial space companies, auto racing industries, and turbomachinery producers.

PLASMA PRINTING MADE SIMPLE

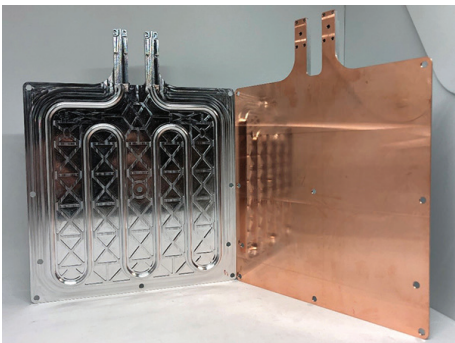
PRINTING ELECTRONICS IN ONE EASY STEP



NASA funding and technologies helped San Jose, California-based company Space Foundry design an innovative plasma-based 3D-printing process for electronics manufacturing. The single-step approach is heat-free and eliminates the curing step, creating huge logistical advantages for additive manufacturing both in space and on Earth. Through the process, the makeup of the plasma adjusts the properties of print materials that are usually difficult to print on temperature-sensitive platforms, such as copper. The technology can be used to print antennas for wearable sensors, mobile communications, and automobiles.

ADDITIVE MANUFACTURING GOES ULTRASONIC

WELDING WITH VIBRATION



With NASA funding, Columbus, Ohio-based Fabrisonic LLC created new spacecraft component designs using ultrasonic additive manufacturing. Components such as heat exchangers are built in single pieces made up of multiple thin layers of metal fused with high-frequency vibrations. The design replaces dozens of small parts and joints, eliminating potential points of failure. Fabrisonic has also added layers of radiation-resistant metal and built-in sensors to aluminum spacecraft parts. The technology has found uses in parts used for oil drilling, aeronautics testing, and nuclear research.

THE STRATEGIC PARTNERSHIPS OFFICE PRESENTS

INNOVATOR HOUR

Do you have questions about protecting your innovation?

Do you want to learn more about how to submit New Technology Reports?

Do you have general questions about technology transfer or partnerships?

SPO can help!

Sign up for a 20-minute Innovator Hour timeslot and get a one-on-one Teams session with a SPO representative!

NEXT SESSION: **TUESDAY, APRIL 12, 1:00-2:00 P.M.**

HOW DO I SIGN UP?

To register for the upcoming session and secure your timeslot, please fill out [this form.](#)

Timeslots available:

1:00-1:20 P.M.

1:20-1:40 P.M.

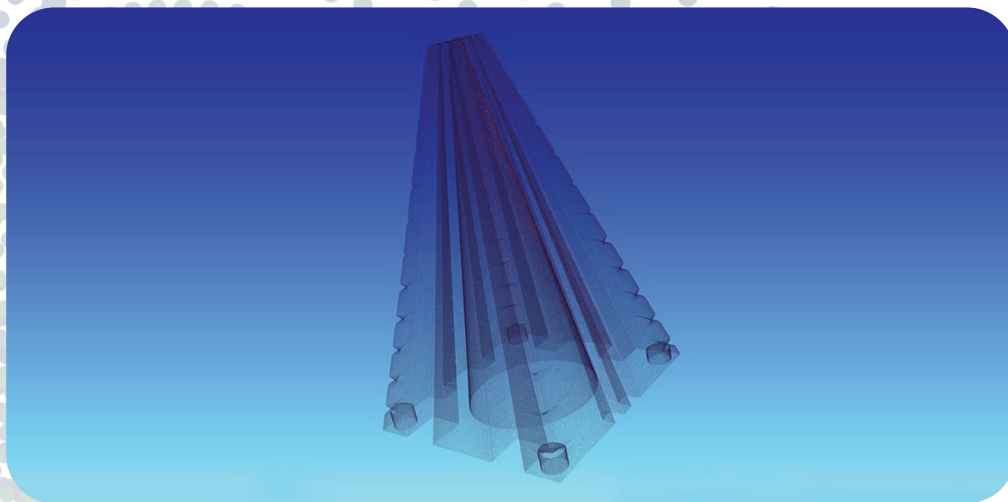
1:40-2:00 P.M.



PYRAMID IMAGE QUALITY INDICATOR WEBINAR

ABOUT THE EVENT:

The Strategic Partnerships Office (SPO) moderated the Pyramid Image Quality Indicator (IQI) Webinar on March 8, featuring innovator Justin S. Jones. The Pyramid IQI, patented in 2021, is a scalable, inexpensive tool to measure computed tomography (CT) system performance..



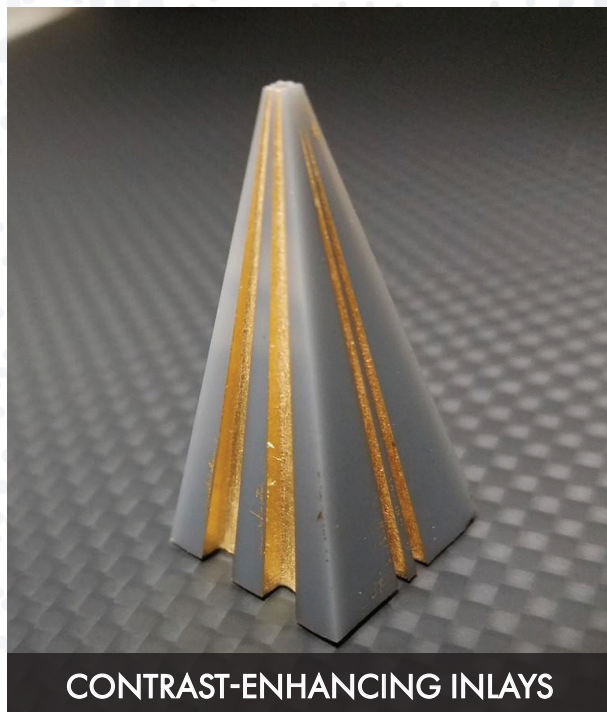
Computed tomography (CT) is a sophisticated radiographic inspection method capable of quantifying a sample's volumetric features in three dimensions. Its complexity, however, makes testing its performance and image quality baseline particularly challenging.

While image quality indicators (IQIs) have been used to assess other inspection systems for decades, there are no equivalent, universally accepted standards for CT. "The traditional IQI devices used in 2D radiography are typically flat, but CT data is inherently volumetric," said Justin Jones, Non-Destructive Evaluation (NDE) Lead at Goddard. As a result, flat objects offer an unrealistic basis for a standard.

With those limitations in mind, Jones and other Goddard researchers developed the Pyramid IQI, a tool specifically designed to compare CT systems and assess CT detectability limits, such as contrast sensitivity and image resolution.

The IQI's pyramid design is axially symmetric, making it more conducive to CT scanning as all features naturally scale smaller near the top, to accommodate scans at different magnifications. The design includes additional features, such as external fiducial reference notches for elevation and alignment, and channels on all four sides for optional contrast-enhancing inlays.

The Pyramid IQI was designed to provide performance baselines and image quality metrics for CT system assessment and comparison, but its versatility gives it additional uses. Because it can be made using any production methods, including additive manufacturing, the Pyramid IQI can also be used as a quality control tool in 3D printing, serving as a baseline to compare the capabilities of different 3D printers and optimize build quality.

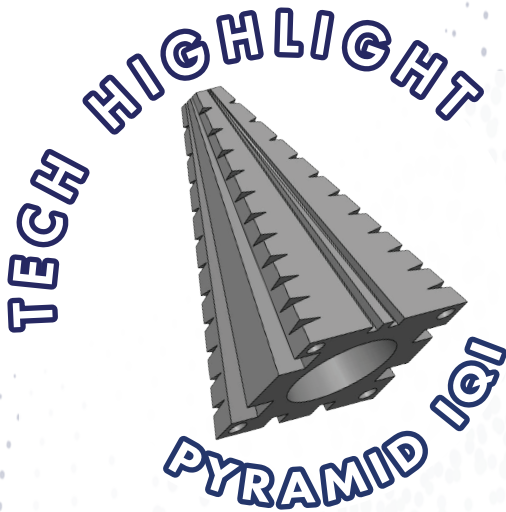


CONTRAST-ENHANCING INLAYS

INNOVATOR SPOTLIGHT

JUSTIN JONES

Justin Jones is a senior materials engineer and the non-destructive evaluation (NDE) subject matter expert at Goddard's Materials Engineering Branch (Code 541). He has submitted seven NTRs and recently received a patent for the Pyramid Image Quality Indicator (IQI) for X-Ray computed tomography (CT).



Jones earned a bachelor's in mechanical engineering and spent a few years working in industry before narrowing his focus to Non-Destructive Evaluation (NDE) for his master's and PhD in materials engineering. He began his career at NASA as an intern at NASA's Langley Research Center during graduate school. After graduation from the Johns Hopkins University and a brief post-doc, he joined Goddard as a materials engineer in 2010.

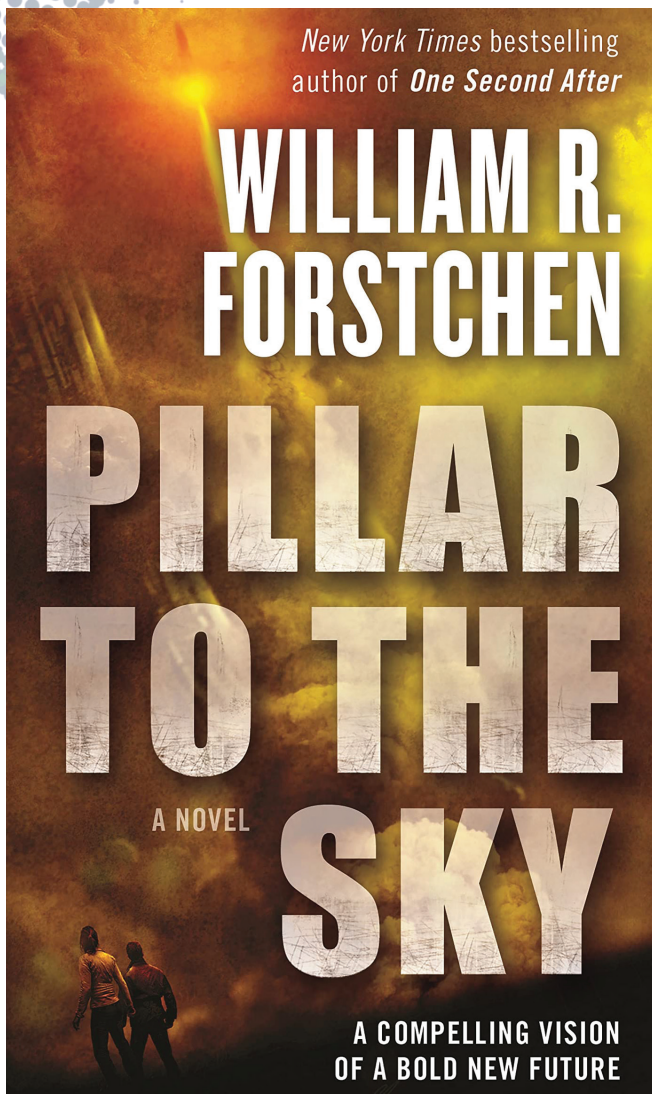
Jones and his colleagues in the Materials Engineering Branch provide technical consultation to virtually all Goddard flight projects with materials evaluation, testing, and failure analysis. He specializes in NDE applications, with a focus on X-Ray CT, the unofficial "gold standard" of NASA NDE for more complex sample geometries and parts.

Jones uses CT to inspect hardware components, developing known defect standards and calibrating inspection systems to evaluate and qualify different materials and fabrication methods. He has also used 3D X-ray imaging to analyze geological samples from the Moon and Mars. With the explosive rise of additive manufacturing, Jones assists NDE research efforts with a focus on 3D-printed components, creating new standards and tools to meet the challenging inspection and analysis demands of additively manufactured parts. One recent development was the Pyramid Image Quality Indicator (with collaborator Antonio Moreno/541), pictured at left, created to help qualify CT system performance which will be key to having standardized approaches to inspect new classes of materials.

Jones has evaluated hardware components and materials for several different flight programs, including the James Webb Space Telescope (JWST), the PACE (Plankton, Aerosol, Cloud, ocean Ecosystem) mission's Ocean Color Instrument, the Roman Space Telescope, and the Mars Capture/Containment and Return System. He is also using 3D X-ray imaging techniques to inspect geological samples from the Moon and Mars.

Beyond NDE, Jones and his colleagues also provide micro-scale mechanical testing. For instance, he has inspected the decay of insulation materials on the Hubble Space Telescope and tested the microshutters created for JWST.

THE LITERARY X-CHANGE BOOK OF THE MONTH



PILLAR TO THE SKY, WILLIAM R. FORSTCHEN:

Pandemic, drought, skyrocketing oil prices, dwindling energy supplies and wars of water scarcity threaten the planet.

Gary Morgan—a brilliant, renegade scientist—is pilloried by the scientific community for his belief in a space elevator: a pillar to the sky, which he believes will make space flight fast, simple and affordable. His wife Eva, also a scientist, wishes to use the tower to mine the power of the sun and supply humanity with cheap, limitless energy forever.

The Goddard Space Flight Center's enormous army of scientists, engineers and astronauts will design, machine, and build the space elevator. They will fight endless battles and overcome countless obstacles every step of the way.

This journey to the stars will not be easy—a tumultuous struggle filled with violence and heroism, love and death, spellbinding beauty and heartbreaking betrayal. The stakes could not be higher. Humanity's salvation will hang in the balance.

(synopsis by Tor Publishing)

WHAT IS THE LITERARY X-CHANGE?

In 2021, the Strategic Partnerships Office (SPO) launched a community library—with a little help from TOR Books. Goddard has partnered for years with Tor, a leading publisher of science fiction, by connecting them with subject matter experts to promote the science in “science fiction.” Located in the lobby of Building 22, The Literary X-Change is available to the entire Goddard community. Here’s how it works:

TAKE ONE

If a book strikes your fancy take it. Read it, enjoy it, and—when you’re done—share it with a friend or bring it back to the X-Change.

GIVE ONE

Everyone can pitch in to keep the library stocked. Bring books you’d like to share with the Goddard community when you can and continue being a friend of The Literary X-Change!